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ABSTRACT

The effects of using a nontraditional peer tutoring format--same age, similar skill level arrangement--were investigated for two school terms on a county wide basis with 2,386 significantly underachieving students in grades 1 through 9 in the curricular areas of reading and mathematics. Certified teachers and paraprofessional aides served as program supervisors and implementors. Results indicated that the same age, similar skill tutoring format is a viable approach for working with low performing students. During both years of the program's implementation, student achievement reached an average of one and one-half times the nationally expected gain score. Students supervised by paraprofessionals and professionals did equally well. Success was traced to a number of factors, including individual attention, personal content, and immediate and frequent feedback. (Author/CL)

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Using Low Achievers to Tutor Reading and Mathematics

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Running Head: Low Achievers as Tutors

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Low Achievers as Tutors

The effects of using a nontraditional tutoring format--same age, similiar skills arrangement, was investigated for two school terms (1979-1980 and 1980-1981) on a county-wide basis with significantly underachieving students in grades 1 through 9 in the curricular areas of reading and mathematics. Certified teachers and paraprofessional aides served as program supervisors and implementors. The results of this study indicated that the same-age, similiar skill tutoring format is a viable approach for educators working with low performing students. Both years that the program was employed, student achievement reached an average of 1½ times the nationally expected average gain score. Implementing this nontraditional tutoring approach with underachievers serving as tutors was successful due to a number of factors. Of particular importance, however, is the need for a well-sequenced, structured curriculum and comprehensive training program for teacher and student participants.

Most teachers and educational researchers are well aware of the instructional merits of both cross-age (e.g., Bell, Garlock & Colella, 1969; Oakland & Williams, 1975) and same-age tutoring (e.g., Allen & Boraks, 1978; Ehly & Larson, 1976; Hamblin & Hamblin, 1972) for improving basic academic skills of low-performing students. Recent evidence further suggests that the positive effects of peer-tutoring are not limited to academics, but extend collaterally to increase students' self-concepts and alter negative attitudes toward school and learning (Ellson, Barber, Engle, & Kampwerth, 1965; Gartner et al., 1971; Ross, 1972).

Within the traditional tutor-tutee arrangement, the tutee is viewed as the learner, the beneficiary of instruction, and the tutor is considered the leader or one who helps. Research and clinical teaching data now have shown that this interpretation of the benefits of tutoring is restrictive. Instead, it has been demonstrated that the tutor may improve academically and personally at a level equal to if not exceeding the tutee. Tutors who previously served as tutees, for instance, gained more in reading and enhanced self-concepts than the students they tutored in a study reported by Ross (1972). Together the results of numerous investigations on the effects of peer-tutoring (e.g., Allen & Boraks, 1978; Bargh & Schul, 1980; Bouchillon & Bouchillon, 1972) should help alleviate the common fear of teachers--that tutors are not learning or gaining valuable skills while in the process of tutoring lower level students.

While the pedagological value of cross-age and same-age tutoring has been firmly established (Ehly & Larsen, 1980), the potential merit of using students of the same age and similiar skill level to tutor each other has not been investigated adequately. In classroom practice, however, the "same-age, similiar skill" approach may be more feasible than traditional tutoring arrangements (e.g.,

cross-age, apprentice-master). Often older students or students perceived as capable of tutoring are simply not available to the teacher. Special education teachers and remedial teachers who have a high concentration of substantially low achieving pupils, nonetheless, are the teachers whose students are in most need of individualized, personalized instruction. These are the teachers and students for whom a same-age, similiar skill tutoring arrangement would be most naturally obtainable, yet potentially most difficult to design and implement.

In the present study a peer-mediated instructional system which employed same-age, similiar skill peers with deficiencies in reading and mathematics was used. The purpose of the program was to determine the instructional feasibility of this nontraditional tutoring arrangement with low achieving students and to assess the relative effect of the program on student mathematics and reading skills.

A pilot project was conducted during the spring semester of the 1978-1979 school year to address the question of feasibility. Test data showed that students with substantial skill deficits (e.g., 2 or more years below grade level), were able to tutor in reading and mathematics. The data also indicated that students who had been allowed to fill both the tutee and tutor role made greater gains than students who had assumed only one role. Subsequently, the peer-mediated program was implemented on a county-wide basis with all students achieving two or more years below grade level (those students in special education classes were not included). It was anticipated that student gains, tutor and tutee, would not meet the nationally expected average gain of nine months in either of the subject areas.

Method

Subjects and Setting

During the 1979-1980 and 1980-1981 school years 704 students in reading and 533 in mathematics and 627 in reading and 522 in mathematics, respectively, participated in the peer-mediated approach. All students were six months or more below grade level with the vast majority of students two or more years below grade level as measured by the California Achievement Tests (CTB/ McGraw-Hill, 1977). Students were enrolled in grades 1 - 9 during the regular school day.

Certified teachers or paraprofessional aides supervised and directed the peer-mediated instructional approach. Teachers instructed an average of 64 students each day, aides a somewhat lesser number.

The study was conducted in a rural middle-eastern Tennessee county. Most of the residents were blue collar and farm workers. The total county population was approximately 12,000 people. The program was implemented in all 13 elementary schools and the one junior high school in the county.

Procedure

A commercial product, Continental Learning Systems' Peer-Mediated Systems: Reading and Peer-Mediated System: Mathematics (Continental Systems, Inc., 1979; 1980; Hendrickson, 1979; 1980) served as the "backbone" of the program. This system included all core tutoring materials, in-service training of staff and students, and follow-up consultation in the classrooms. Implementation rules specified by the company were followed. These rules allowed for consistency across classrooms, but flexibility within each classroon. A main objective of the program is to enable teachers to incorporate their own teaching style and materials resources into the program yet adhere to basis tutoring procedures.

A brief discussion of the major factors related to same-age, similiar skill tutoring program utilization are presented below:

Schedule of activities. Prior to implementing the peer-mediation process in the classroom, extensive in-service training of teachers and aides was conducted. These training sessions involved providing the teacher with first hand experiences using the materials, setting up recordkeeping files, carrying-on tutor-tutee training after the program is initiated, and the presenting of general information relevant to using a tutoring program.

Prior to full program implementation, pretesting of students was conducted by the regular classroom teachers in accordance with the county's overall evaluation plan. Actual implementation of the tutoring process did not proceed in all classrooms until late October after pre-testing on the California Achievement Tests (CTB/McGraw-Hill, 1977). Posttesting was conducted during April of the following year, again as part of the county's testing program. In all, peer-mediated instruction was in effect for just over five months from pretest to posttest dates.

Core curricular materials. Continental Learning Systems' core tutoring materials included Tutor's Guides, mastery achievement checks, supplemental materials, parental success notices and award certificates. The reading materials were divided into two basic units,--a phonics and vocabulary building program and a vocabulary building and comprehension program. The mathematics program was very traditional in content and organization. It included units on numeration, addition, subtraction, multiplication and division in Part I. Part II consisted of units on fractions, decimals, percent and probability, and measurement (the English and metric systems). A brief description of these materials follows:

1. Tutor's Guides were the main instructional texts used daily by the learning teams. The format and content of each guide was controlled carefully and designed for use by student teams. The Guides were divided into modules and these modules were subdivided into sets. Each set and each module had to be completed correctly before the student moved forward to the next set or module.

2. Student Performance Record Sheets were provided to allow for simple, accurate daily acounting of each student's performance. The tutor or leader generally kept this record.

3. Achievement Checks were tests designed to evaluate student mastery of each module. Mastery criterion was 100%, and only teachers were allowed to administer these tests.

4. Supplemental Worksheets accompanied and reinforced skills learned in the Tutor's Guides. Teachers were encouraged to and guided in the use of other materials to motivate and promote generalization of skills.

5. Student Success Notices were "official looking" cards sent home frequently as interim reports of student progress. At the end of the year each student was awarded an Award Certificate.

In-service training and follow-up consultation. Teacher in-service workshops were held prior to the onset of the school year and intermittently during the year to build and refine teacher and aide supervisory and management skills. Lecture and simulation formats were used frequently. During the year, trained consultants visited in the classrooms and gave suggestions in relation to the overall curriculum and instruction plan and peer-tutoring in general.

Tutor orientation and training. Both tutors and tutees participated in all initial orientation and training sessions. These sessions were designed to enable students to become familiar with the goals of the program, the materials and their use, the roles and responsibilities of tutors and tutees, and to keep and maintain records accurately. After the first training sessions teachers assumed responsibilitiy for further training and maintenance of student tutoring. The second year of the program the teachers trained their own students without the involvement of external consultants.

Typically, a week to ten days was required for students to become fairly adept in implementing the tutoring procedures, recordkeeping system, and other tutoring-related procedures. On a daily basis teachers were responsible for presenting new information and skills to students, reviewing tutoring tactics, and providing supplemental work to students. Very often teachers presented a numberof sets from the Tutor's Guides to the entire group or subgroup of students before allowing them to proceed in the curriculum. Observing for errors and initiating creative "error prevention" activities were critical with this population of tutors and tutees.

The teacher's role. Teachers and teacher aides functioned more as instructional managers than traditional classroom teachers although they performed many of the instructional activities they had in the past. Summarizing, the main functions of the teacher included: a) selecting teams, b) maintaining the filing system, c) observing student attitudes and progress on a daily basis, d) providing continuous support and feeback to student teams, e) administering Achievement Checks, f) organizing and displaying all materials used in the program, g) utilizing consultants effectively, and h) doing whatever necessary to

provide a positive and enthusiastic learning environment for children.

The tutor's role. All students were taught tutor responsibilities since they were expected to perform as tutors when and if they demonstrated some basic tutoring competencies (e.g., use of the tutoring strategy). The main tutor responsibilities were to a) take care of the core tutoring materials, b) use the teaching strategy they had learned, c) use the materials sequentially, d) watch for errors, e) ask questions when in any doubt, f) complete independent assignments, and g) maintain a friendly, helping attitude. Tutees were told that they had essentially the same duties. They were, however, to follow the instructions of the tutor and let the tutor lead as they worked in the Guides.

The tutoring strategy. Both reading and mathematics tutoring involved oral recitation and interaction between members of the team on a daily basis. As the teams progressed through the Tutor's Guides the tutor used a simple teaching strategy to present information in each set of each module. The strategy consisted of four steps: 1) giving an instruction, 2) modeling or demonstrating the answer, 3) giving the tutee an opportunity to respond alone correctly, and 4) the delivery of praise or simply an acknowledgement of each correct response (e.g., great, mm-hmmm.). With minor variations, this strategy was used to teach all reading and math skills.

The correction strategy. Tutors were taught to use a very specific, non-punitive procedure for correcting errors. The first time an error occurred, the tutor simply modeled the answer again for the partner. If the error was repeated, the tutor stopped work in the Tutor's Guides and made flash cards with examples of known and unknown items. Then the tutor returned to the Guide and the "set" that was being worked upon and completed it before moving to the next set in the module. If the partner continued to have difficulty with

the same word (problem), the tutor raised his or her hand and requested teacher assistance. Tutors were encouraged to never use negative statements such as "that's wrong; don't you remember anything; no, I said _____." Rather they were instructed and encouraged to work and practice in a positive manner until the error was corrected.

Selecting tutors and forming teams. One essential point for teachers to remember when using students of the same age and approximate skill levels to work in teams is that the differential role of the tutor and tutee must be maintained fairly rigidly during the tutoring sessions, i.e., during the one-to-one sessions in the Tutor's Guides. Otherwise, arguments and confusion over who is to do what to whom will arise on a daily basis. In selecting the leader (tutor), the teacher should consider students who have some leadership ability, get along with others, have regular attendance and are possibly slightly above the partner in terms of academic skills and/or general behavioral maturity. It should always be understood that the teacher may choose to re-arrange teams at any time, but that it is much preferred that the same students work together for an extended period of time. Indeed, with older students the teacher may wish to switch tutor-tutee roles after each module or six week grading period.

There appeared to be five main factors that teachers using the same-age, similiar skill tutoring arrangement needed to consider and address in their classrooms. These factors (as opposed to conditions during traditional tutoring sessions included: 1) more teacher involvement and direct supervision in all apsects of the peer-mediation process, 2) clear demonstration of the fact that both team members were equals (and that they must assist each other in spite of the fact that one was the tutor) and that their achievement gains would be fairly equal, 3) student understanding of their individual roles and responsibilities in the program be they tutor, tutee, or both at times, 4) continual

emphasis on careful and correct tutoring, and 5) provision for additional motivational activities, exercises, and tactics to maintain student enthusiasm.

Classroom implementation. Each peer-mediated classroom was similiar to all other peer-mediated classrooms with regard to general recordkeeping procedures, tutor training activities, teacher error prevention activities (e.g., presenting material to student teams before they work independently, providing timely skill-reinformcement activities, etc.), classroom activity level, and so on. On the other hand, each classroom did vary somewhat. In particular, with younger students the time spent in peer-medited instruction consisted of brief sessions intermingled with supplemental, reinforcing work. Young students did not keep their own recoreds and often the teacher or aide progressed through the curriculum at a pace based on the performance of the class or a small group of students. "Tutoring" consisted more of team practice on given sets than bona fide tutoring. With other students more time was spent in the Tutor's Guides each day. Students were required to perform many more tasks than the younger students (e.g., get and replace materials, use materials and recordkeeping forms correctly, use the complete tutoring strategy, etc.). Teacher aides working with small groups of children in grades 1 - 3 often acted as the tutor for the students.

In addition, some teachers preferred to have one-to-one tutoring sessions every day for a iimited time period, while other teachers preferred to allow their students to work all class period for as many days as necessary to finish a given module. At that time the latter set of teachers provided the students with varying supplemental work done independently or in a teacher-directed manner.

The administration's role. The program required considerable rethinking on the part of teachers and administrators. While most perceived the potential benefits, everyone was aware of the potential pitfalls. Consequently, in an atmosphere of great questioning it was vital to have a supervising administrator, in this case a local supervisor, on site to direct and guide teachers as the need arose. Furthermore, it was important school principals be well-informed of the program, its manner of implementation and the few special requests that could develop (e.g., explaining to parents why their child was being taught by a student and not the teacher).

Results

Test administration, scoring and data analysis were conducted in the same manner as the school system had executed those acitivites in previous years. Test administration was conducted in the separate school buildings in the regular classrooms (i.e., not by the teachers who were involved in the program). All tests were sent to the University of Tennessee (Knoxville) to be scored and analyzed. The results of both the 1979-1980 and 1980-1981 programs indicated that student gain scores from pre- to posttest exceeded the nationally expected average gain of nine months. Students under the supervision of teachers and teacher aides did comparably well in both the areas of reading and mathematics.

1979 - 1980 School Year

The overal average gains students in self-contained classrooms made during the 1979-1980 school year were one year and two months (14 months) in reading and one year and three months (15 months) in mathematics. Average gains for students of teacher aides were two years (24 months) in reading and one year and five months (17 months) in math.

1980 - 1981 School Year

The results of the 1980-1981 evaluation showed that students in reading and mathematics under the supervision of certified teachers gained an average of one year and three months (15 months) in reading and one year and four months (16 months) in mathematics. Teacher aides' students gained an average of nine months (9 months) in reading and one year and one month (13 months) in mathematics.

Students Returning to the Regular Classroom

An implicit goal of any instructional system is not only to demonstrate evidence of numerical changes of statistical significance, but to cause educationally significant changes to occur. In the case of the remedial program involved in the current study, the local program goal was met when students were returned to the regular classroom on a full-time basis. The degree to which these "returnees" were able to function without further supplemental instruction became the ultimate measure of the program's success.

During the 1979-1980 and 1980-1981 school years teachers and aides participating in the peer-mediated approach (i.e., all persons working solely with underachieving children) had a high "return rate". After posttesting in 1980 for the 1979-1980 school year, 42% and 52% of the students in the reading program supervised by teachers and aides, respectively, became "non-eligible" for continued supplemental instructional support services. Fifty-six percent of the mathematics teachers' students "graduated", while 51% of the teacher aides' students would receive no further supplemental work. Similiarly, after the 1980-1981 school year, reading teachers graduated 36% of their enrollment; aides graduated 61% of their students. In mathematics, 71% of the teachers' students became non-eligible, while 39% of the aides' students would not receive further

supplemental programming. At this time, the local school system has indicated that the vast majority of students returned to the regular classroom have been able to remain in these rooms without supplemental instruction (Way, 1982).

Discussion

To date little clinical or research attention as been directed at the use of same-age, similiar skill peers working in tutorial arrangements. Thus, while there are data to suggest that the academic and social-personal skills of preschool children (Hamblin & Hamblin, 1972; Hendrickson & Freedman, 1980; Long & Madsen, 1975), underachieving children (Ehly & Larsen, 1980), and even handicapped youngsters (Young, 1981) may be affected positively with peer-intervention strategies, the use of such strategies within fairly homogeneous groupings of such children is less documented. The present study employed a peer-mediated intervention strategy to teach basic reading and mathematics skills to significantly underachieving students in grades 1 through 9. The results indicated that the same-age, similiar skill tutorial format could be used productively by these children. Student scores on curriculum embedded criterion-referenced tests showed specific gains on skills acquired and mastered in each subject area. Pre- and posttest gain scores on a standardized, norm-referenced achievement test (i.e., California Achievement Tests) confirmed overall achievement gains in the target subject areas. A noteworthy outcome of the study was the relatively equivalent gains students supervised by paraprofessionals and teachers made. On the average, for two consecutive school years the students of the paraprofessional supervisors and the certified teachers made relatively equal gains. The students of both teachers and aides gained approximately 1½ times the national average.

In addition to a built-in provision for flexibility in the implementation of the this nontraditional peer-tutoring approach, there were several design features of the Peer-Mediated System: Reading (Continental Systems, Inc., 1979; 1980) and Peer-Mediated System: Mathematics (Hendrickson, 1979; 1980) that may account partially for the success of the program. In general, the program and materials were designed to include many features of "programmed tutoring" materials with the inclusion of intensive teacher training and follow-up consultation. Specifically, the systems retained many of the characteristics that White (1971) and Ellson, Harris, and Barber (1968) suggested were central to successful peer-mediation with the types of students participating in the present study. The features included: a) a pre-specified sequence and content of curricular materials that allowed for practice and review, b) the breaking-down of learning units into small steps, c) an overall process for deciding what materials to use each day and how to use them, d) a provision for consistent, immediate reinforement for correct tutee responses, 3) a provision for a non-punishing method of treating failures (errors), f) clear specification of participant roles and responsibilities, and g) objectives and direct measurement tools for assessing mastery.

As in traditional tutoring programs the same-age, similiar skills approach was likely to have generated the "therapeutic effect" of helping students gain more confidence in themselves and their learning abilities due to their many daily successess (Ellson et al., 1968). Individual attention, close personal contact, immediate and frequent feedback on their performance and learning in a relaxed environment were likely to have had a positive influence on the motivation and attention levels of students.

While the results of this peer-mediated instruction system were positive in terms of student achievement gains, it should be remembered that potential pitfalls do exist. When students with academic and perhaps behavioral deficits are paired together to work in teams, the teacher now more than ever must be alert to all of the interactions, social and academics-related that occur in the classroom. Thorough organization and planning, along with continuous monitoring and guidance of teams is a must. These factors and an optimistic, goal-oriented teacher are certainly tied to student success rates.

In summary, this study adds support to the proposal that low performing students can function in helping roles to the benefit for themsleves and their age-peer partners. Such a nontraditional arrangement of tutor-tutee teams, however, requires a special curriculum and a corresponding training program for both teachers and students involved. This study indicates also that well-trained and well-supervised paraprofessionals as well as certified teachers can implement effectively the same-age, similiar skill tutoring concept. The approach accelerated the learning rates of primary-school, middle-school and junior high school students in both reading and mathematics and is recommended as an alternative instructional mode for teachers attempting individualization and remediation.

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